# USER'S MANUAL

# WURLITZER-V

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YOUR EXPERIENCE • YOUR SOUND

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# 1 INTRODUCTION

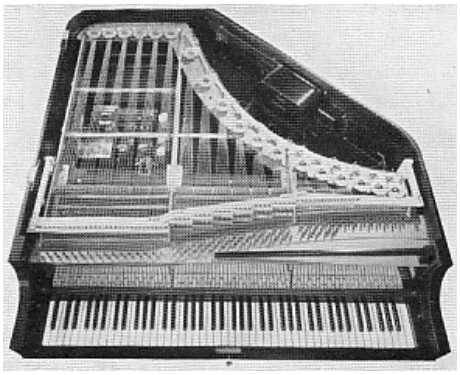
## 1.1 The electric piano

### *1.1.1 Terminology*

An electric piano is an electromechanical musical instrument. Sounds are produced mechanically and then turned into electrical signals by using electronic pickups. This is quite different from an electronic piano, which simulates the timbre of a piano (or others instruments) using analog or digital circuitry.

### *1.1.2 Origin*

The earliest electric pianos were invented in the late 1920s; the 1929 German *Neo-Bechstein* electric grand piano was among the first. Probably, the earliest model of electric piano was the *Vivi-Tone Clavier* created by the Gibson sound engineer and master luthier Lloyd Loar. When the instrument was discovered in 1994, amazingly, the instrument was still in perfect tune!



*Neo-Bechstein Electric Grand Piano*

*ViViTone Clavier*

### *1.1.3 Technologies*

Different method of tone production exist among electric pianos. They vary from one model to another, the most common are: struck strings (Yamaha, Baldwin, Helpinstill, Kawai), tuning-forks (Fender Rhodes, Hohner´s "Electra piano"), plucked reeds (Hohner´s "Pianet" and "Cembalet", Weltmeister claviset) and struck reeds (Wurlitzer, Denon Elepian). We cannot say that one method is better than another; each of these technologies have their own tone and character.

### *1.1.4 Popularity*

The goal at the beginning was to provide a piano which did not detune, and could be easier to transport than a real piano. The electric piano started as a product to be more convenient but

then acquired a musical identity of its own. Musicians developed playing techniques with their instruments and created their own sounds using a variety of effects like phase shifters, delays and tremolos to enhance the possibilities of the sound. The popularity of the electric piano reached its height during the 70s; many legendary bands have used these instruments like The Beatles, the Doors, Herbie Hancock, Chick Corea, Pink Floyd, Led Zeppelin, Ray Charles, Queen, Supertramp, Elton John, etc.

*The band SUPERTRAMP playing the Wurlitzer*

Most electric piano players seem to be divided into two camps: Rhodes Mark II or Wurlitzer EP 200-A. Tonally and attack-wise the Wurlitzer seems to sit more comfortably with an amplified guitar-based rock band a than does the Rhodes. It can even replace a rhythm guitar quite successfully, whereas the Rhodes is more of a solo instrument, suited to fusion, acid jazz, other jazz styles, the truth is that both of them are real jewels !

*Rhodes Mark II*

*Wurlitzer EP 200-A*

These instruments were eventually replaced by synthesizers or electronic pianos capable of piano-like sounds without the disadvantages of moving mechanical parts. These were also lighter and smaller.

However, to our delight, electric pianos are coming back into fashion. Companies who went out of business years ago are back making new models again and the prices of vintage used instruments has climbed so that these are now out of reach of most people.

# 1.2 The Wurlitzer EP 200-A

## *1.2.1 History*

For many years the Wurlitzer EP 200-A was a staple of the rock´n rollers keyboard players arsenal. The Wurlitzer electric piano was first manufactured in the very early 60´s for domestic usage in the home environment. The Wurlitzer electric piano was the first electric piano to be manufactured and sold. The sound and portability soon led to professional stage use as the piano proved a useful tool for musicians.

Originally conceived decades earlier by one B.F. Meissner, whose idea of removing the sound board of an ordinary acoustic piano and placing electromagnetic pickups on each string (like an electric guitar) met with some success. He sold this concept to the Everett piano company, who then produced the Orgatron. This utilized Meissner´s individual pickup arrangement, but instead of striking a string for a percussive attack, Everett´s system incorporated air blowing over flat reeds for an "electric" organ / harmonium effect.

*Orgatron*

Wurlitzer, the giant American Jukebox / Theatre Organ company, realized that this concept could be made into an effective amplified piano by striking a metal reed with a hammer, and thus the Wurlitzer Electric Piano was born.

The instrument entered production in 1954 as the EP-110, followed by the 111 and 112 of 1955, and continued to be produced in various forms until about 1982 when production of the EP 200-A ceased.

The EP 200-A established itself as the most popular model among collectors and players alike. It´s the latest of the reed-based pianos, the lightest in weight, and probably has the best action and sound amplification of all the models.

*Wurlitzer EP-200A*

## *1.2.2 Description*

The EP 200-A used a "bag of shot" genuine piano action with the hammers striking the flat reeds at around middle point, causing the reed to vibrate which was then in turn converted to electric energy by electrostatic pickups. It´s a 64-note instrument whose keyboard range was from A an octave above the lowest note of a standard 88-note piano to the C an octave below the top note of an 88-note piano. The plastic-body was only available in black and avocado green. It had an internal amplifier and two loudspeakers facing the player. A tremolo effect was incorporated, and the audio output allowed to connect the Wurlitzer to a Guitar amp or a PA. The production started in 1972.

*Inside the Wurlitzer EP-200A*

| | |
|---|---|
| **Keyboard Range** | 64 notes, A-13 thru C-76 |
| **Height** (from floor to keys with legs) | 28 5/8" |
| **Height of case** (less legs) | 7 1/8" |
| **Height** (from floor to top of case, not including music panel) | 33" |
| **Overall width** | 40" |
| **Overall Depth** | 18 9/16" |
| **Weight** (less legs and pedal) | 56 lbs |
| **Legs** | Removable chrome plated steel legs, two of which have leveling glides |

*Wurlitzer EP 200-A SPECIFICATIONS (from the original manual)*

## 1.2.3 Sound

Compared with its rival, the Fender Rhodes Mark II, the Wurlitzer EP 200-A has a brighter, more hollow sound. When played gently the sound can be quite sweet and vibraphone-like sounding very similar to the Rhodes; while becoming more aggressive with harder playing, producing a characteristic slightly overdriven tone usually described as a "bark". In a pop or rock band setting with guitar, bass and drums, the Wurlitzer has a distinctive and clear sound where a Rhodes tend to blend in. However it has also been used successfully in MOR ballads and even country music.

## 1.2.4 Maintenance

The Wurlitzer is an absolute nightmare to tune. On the end of each reed is a lump of solder, removing some makes the note sharper in pitch, while conversely, adding more solder flattens the pitch. Just loosening the reed and re-tightening it is enough to change the tuning. Should you dare try removing some of the solder whilst the reed is still in the pickup assembly, microscopic lead filing can cause havoc, shorting out between reed and pickup, and nasty sounds result when played. Also, if the actual overall shape of the lump of solder is altered too radically, the timbre of the note may start to change ! Each note has its own exact reed size although it is possible to tune up or down 2 semitones without adversely affecting timbre or pitch.

## 1.2.5 Discography

It´s impossible to list all the records using the EP 200-A, but here is a suggested list of famous recording using this fantastic Wurlitzer.

The Archies – Sugar sugar

Beck – Where its At

Belle & Sebastian – The boy with the Arab strap

Bob Dylan – Til I fell in love with you

Chicago – Feelin stronger every day

Daft Punk – Digital love

The Doors – Queen on the highway

Eels – Agony

Elton John – Lady Samantha

George Harrisson – All those years ago

Jet – Bring it on back

John Lennon – How do you sleep

Justice – Valentine

The Mars Volta – Inertiatic ESP

Marvin Gaye – I heard it through the grave pine

Muse – Hate this and I´ll love you

Neil young – The old laughing baby

Norah Jones – What am I to you

Panic at the Disco – Mad as rabbits

Paul McCartney – Ram oh

Pink Floyd – Money

Queen – You´re my best friend

Ray Charles – What´d I say

Stereolab – Infinity girl

Stevie Wonder – Love having you around

Supertramp – The logical song

Tori Amos – Pancake

Van Halen – And the cradle will rock...

Wilco – I am trying to break your heart

Today it is quite hard to get a hold of a Wurlitzer in good condition. They are sadly not the most frequently used keyboard instrument in the music industry and are quite rare these days. Fortunately the Wurlitzer V is here to give it a second life, and allowing us the relief of tuning troubles !

# 1.3 Physical modeling synthesis

There are various methods to create a sound in the world of sound synthesis. **Additive synthesis** (creates timbre by adding sine waves together), **Subtractive synthesis** (in which partials of an audio signal are attenuated by a filter to alter the timbre of the sound), **Sample Playback** (where recordings of the original sound played back), **Granular synthesis** (a basic sound synthesis method that operates on the microsound time scale, based on the same principle as sampling) and **Physical modeling synthesis**. This is a method in which the waveform of the sound to be generated is computed by using a mathematical model, being a set of equations and algorithms to simulate a physical source of sound.

## *1.3.1 Music... and mathematics*

A physical model consists of the laws of physics that govern the sound production, and will typically have several parameters, some of which are constants that describe the physical materials and dimensions of the instrument, while others are time-dependent sections that describe the player´s interaction with it, such as plucking a string, or covering tone-holes.

This idea is very old in the history of sound synthesis, but has been limited to recent development due to the computational complexity and speed of computers..

## *1.3.2 The puzzle*

To model the sound of a drum, there would be a formula for how striking the drumhead injects energy into a two dimensional membrane. The properties of the striker (stiffness, the velocity of the hit, the material, and how the strike happens) the membrane (mass density, stiffness, etc.), its coupling with the resonance of the cylindrical body of the drum, and the conditions at its boundaries (a rigid termination to the drum´s body) would all have to be described in the formula to work out the generation of sound.

Similar stages to be modeled can be found in instruments such as an acoustic guitar. A few years ago, a French scientist had made a complete modeling of all acoustic guitar parameters. The calculations lasted three days to produce the sound !

The challenge in physical modeling synthesis is to simplify the algorithms and the computations to get a model which can be used in real-time.

## *1.3.3 The revolution*

There are several methods of Physical modeling synthesis; Karplus-Strong algorithms, digital waveguide synthesis, formant synthesis … each one using a different paradigm to describe a sound to musical destination.

The strong point is that physical modeling synthesis comes very close to the sound quality of real instruments, using 1000 times less space than the "sampling" method. Imagine an electronic instrument that is small and portable, and can faithfully reproduce the crisp notes of a Steinway piano, the sweet sound of a Stradivarius violin or the brilliant tone of a trumpet, there is no limit with physical modeling synthesis !

A lot of universities, and research centers understood the benefits of this technology, and a revolutionary "equation" has been developed in the prestigious Institute of mathematics of Toulouse to recreate piano and electric piano´s sound. This brand new physical model has been implemented in this Wurlitzer V. The result is just magic, notes are really played ("constructed" in real-time, like on a real Wurlitzer), the sound is alive, not static: it is not a simple recording, it is a genuine instrument that responds to the player´s interpretation. And it´s really light on the computer, it does not require huge data storage involving a whole collection of DVD´s, it loads easily into RAM, and installation is very fast.

# 2 ACTIVATION & FIRST START

Wurlitzer V works on computers equipped with Windows 7 or 8 and Mac OS X 10.7 or later. You can use the stand-alone version or use Wurlitzer V as an Audio Units, AAX, VST2 or

VST3 instrument.

## 2.1 Register & Activate

Once the Wurlitzer V has been installed, the next step is to register the software in order to obtain the activation code that will enable you to use it.

The registration process will require you to enter the serial number and the unlock code you received with the product.

In order to proceed, go to this web page and follow the instructions:

http://www.arturia.com/register

Note: If you don't have an Arturia account yet, you will need to create one. The process is quick, but it does require that you can access your e-mail address during the registration process.

Once you have acquired an Arturia account you will be able to register the product.

# 3 USER INTERFACE

In this chapter we will talk about all the tools which will help you to interact with the Wurlitzer V. We tried to make the use of the Wurlitzer V as simple and fun as possible.

## 3.1 Menu bar

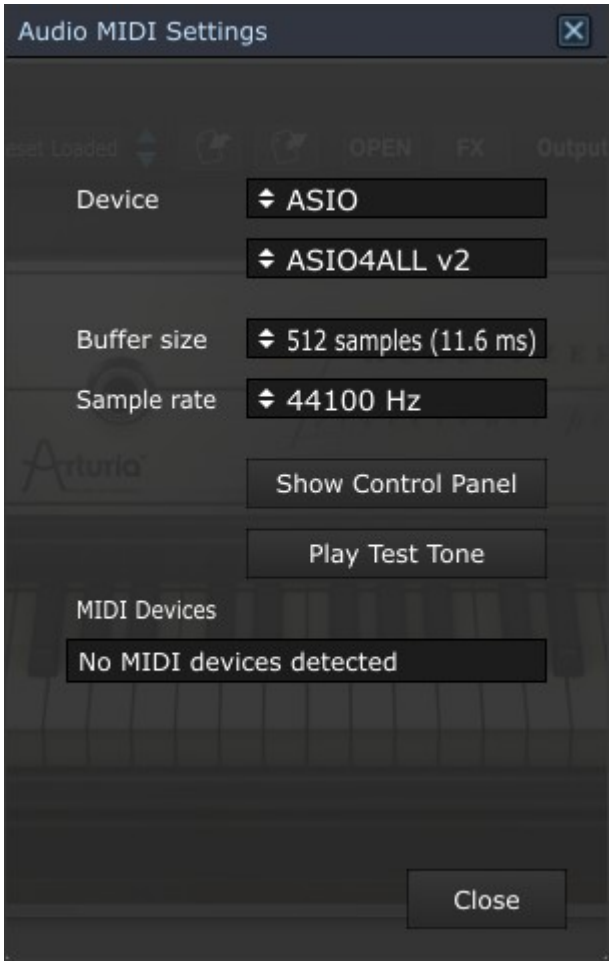
The instrument has a menu bar allowing the setting of MIDI event input routing, and the output of the sound. You will also find a setting for how the knobs respond, and the options for the skin color. This menu is available in **Standalone** mode, but your computer will keep your settings when using the Wurlitzer V with a host DAW.

### *3.1.1 Configuring audio and MIDI*

Click on the **Setup > Audio MIDI Settings** menu:

This is the same dialog box that appears when starting the software for the first time. Here you can:

- Select the audio interface
- Set the audio output port
- Set the buffer size
- Set the sample rate
- Select one or several active MIDI input port(s)




### *3.1.2 Configuring knob mode*

Menu **Setup > Knobs mode** sets how knobs operate: either in "circular" mode (you have to turn around them with the mouse) or in easier "Linear" mode (moving the mouse vertically turns the knobs).

### *3.1.3 Configuring skin color*

Menu **Setup > Wurlitzer color** allows you to choose between two on-screen colors: black or white.

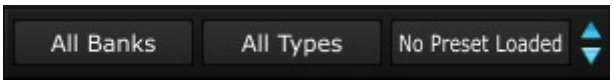
## 3.2 Use of Presets and tool bar

Presets let you memorize the sounds of the Wurlitzer V. A preset contains all of the information pertaining to the reproduction of a sound. In the program, the presets are organized in "banks" and "types". Each bank contains a certain number of types, which generally determine a type of sound, for example "FX". Each type contains within itself a certain number of presets.

The Wurlitzer V is shipped with several "factory" banks, but it is possible to create new "user" banks of sounds, each containing a number of types and presets. For security, the "factory" banks cannot be directly modified. To create a new preset, you must open an existing preset, use the **SAVE AS** feature and save it as a new personalized preset.

### *3.2.1 Select a bank, type, preset*

The bank, type and preset in use by the Wurlitzer V are permanently displayed in the plug-in tool bar.




To choose a preset in the current type, click on the right most button, and a drop-down menu appears with a list of the presets of the same type. You can choose another preset by selecting the corresponding line in the drop-down menu. As soon as the preset has been chosen, you can play the new sound on your MIDI keyboard or from your sequencer.

To choose a preset in the same main bank, but a different type, click on the type button, and a drop-down menu appears with a list of the types contained in the same main bank. Each type listed in the menu allows you to open a sub-menu containing its presets. A click on a preset allows you to directly choose a preset in the new type.

To choose a preset in another bank, click on the left most button. A drop-down menu appears

with a list of the main banks available with the types corresponding to the types defined in each main bank and to the presets contained in each type. You cans thus freely choose a preset by clicking on its name.

In the bank drop-down menu, the "All Banks" option allows you to open a sub-list with all of the types available in all of the banks. This gives you access directly to all of the presets of a given type, for example all of the basses, no matter which bank they are in. This function is particularly useful to quickly see all of the presets of the same type.

When a preset has been modified, an asterisk appears next to its name in the tool bar.

### *3.2.2 Saving an user preset*

To save your setting modifications in the current preset, click on the "Save" button in the tool bar of the Wurlitzer V.

If you want to save your settings under another preset name, click on the "Save as" button in the tool bar. A drop-down menu appears and lets you choose an existing preset (in this case, the contents of the existing preset will be replaced with the current setting), or lets you save your settings as a new preset (in this case, click on "New preset..." in the type of your choice).

When you are working from a factory preset, which cannot be deleted, clicking on the "Save" button will not replace the current factory preset, but will instead automatically open the "Save as" menu to save the current settings as a user preset.

### 3.2.3 Import / Export a bank of presets

It is possible to import or export new banks of presets created in Wurlitzer V. To import a new bank of presets, click on the preset bank import button on the tool bar:

When you click on this button, a window will appear allowing you to choose the preset bank file for the Wurlitzer V (".wurx" extension). Choose the file that you want to import, and click "Open". The new bank of presets will automatically appear among the available banks.

The Wurlitzer V equally offers the possibility to export your own sounds to save them, to use them on another machine, or to make them available to other users.

It is possible to export a preset, a type, or a complete bank.

To export the current bank, type, or preset, click on the preset bank export button in the tool bar of the program:

Select the type of export that you want to perform (bank, type or preset) and a window will appear, giving you access to a choice of destination folder and file name for the bank that you are exporting.

### 3.2.4 Open mode

In open mode you will have access to a number of parameters that allow for many more sound design capabilities. You will be able to tailor the sound you are looking for in unique ways!

The OPEN mode features:

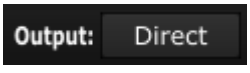
| | |
|---|---|
| **Equalizer** | The 10 band graphic Equalizer provides control over the sound spectrum for the Wurlitzer V. |
| **Vibrato Rate** | Sets the speed of the vibrato. |
| **Pickup Distance** | Sets the distance between the tone source and the pickup. When the pickup is moved closer to the tone source, the sound becomes more distorted and the timbre between soft and loud increases. |

| | |
|---|---|
| **Pickup Axis** | In the real Wurlitzer, the pickup is not exactly in front of the tone source at rest. When it is exactly in front, due to the symmetry of the device, the note jumps one octave higher than the normal tone. Turning the pickup Axis knob clockwise makes the pickup move from an unsymmetrical position to a symmetric position, providing a wide range of timbres. |
| **Impedance** | Sets the mechanical impedance of the tines: the greater the impedance, the longer the sound becomes. |
| **Dynamics** | Controls the loudness level between pianissimo and fortissimo. Thanks to the fact that the effect is applied during calculating each note, dynamics feature can be seen as the perfect compressor as it allows you to adjust the dynamics without any distortion. |
| **Octave Stretch** | Octave stretch allows you to simulate a stretch tuning. It can go from subtle to extreme. |
| **Hammer Hardness** | You can choose the hammer hardness.The harder the felt, the more brilliant the sound becomes. |
| **Hammer Noise** | You can adjust the hammer noise, that is, the weight of the hammer percussion sound. With a loud hammer noise, you will feel as though you are standing close to the piano. |
| **Note Off Noise** | Sets the level of key release noise. |
| **Sustain Pedal Noise** | On a Wurlitzer you can hear the mechanical action of the sustain pedal. You can set how loud or soft you want this mechanical noise. |
| **Velocity Curve** | Allows you to adjust the response to your keyboard. |

## *3.2.5 FX Panel*

When you activate this button, the effects panel will automatically slide open below the Wurlitzer V keyboard. This will also allow access to the guitar amp, Leslie and direct reverb settings. For further information, please refer to chapter 3.5 (The effects).

## *3.2.6 Output mode*




You can choose between 3 output signal path options, they simulate three different devices

connected at the output (after the effects unit):

- **Direct:** The Wurlitzer V, and the effects are connected to a direct box, that will allow you to listen the pure sound on the output. There is a reverb that follows the direct box, just as it would be in a studio.

- **Guitar amp:** The concept is to recreate the sound of the Wurlitzer used in the typical "garage band" situation. We added a guitar amp simulator with multiple mic and speaker options. The reverb is a simple spring reverb in the output selection.

- **Leslie:** The Leslie speaker is normally associated with the organ but we think it works great with Wurlitzer. You get that movement in the sound plus a bit of gain crunch.

## *3.2.7 Variation option*

In this menu you will find different harmonic structures of the Wurlitzer tone generator. These different variations can be subtle harmonic changes to radical changes meant to create a totally new, crazy Wurlitzer.

## *3.2.8 Maximum Polyphony*

By clicking this button, you will be able to adjust the upper limit for the number of voices played the Wurlitzer V. It can be set from 1 to 256. Having lower setting will result in less CPU being used. Setting the number too low can create situation where the voices cut off and create unnatural sustains. The key is to find a balance that you and your computer can both live with.

## *3.2.9 Panic button*

If something happens where there is an interruption in your MIDI data to your computer, you can end up with notes that never receive a NOTE OFF message. This will create a situation where the note will always be on. It is possible to send a message within Wurlitzer V software that will cut of the notes that haven´t stopped. To do this, click on the PANIC button to shut off all notes that might be stuck on.

## *3.2.10 CPU usage indicator*

The processor usage gauge lets you see how much processing power is being used by Wurlitzer V ´s sound synthesis in real time. This gauge is directly visible in the instruments tool bar.

Attention: This information only corresponds to the processor rate dedicated to sound synthesis in Wurlitzer V, it will not show the global system load of other programs that may running at the same time.

## *3.2.11 MIDI channel selection*

It can be useful to select the MIDI channel(s) the Wurlitzer V will receive on. You can choose between the 16 MIDI channels. For example, If you choose channel 1, the MIDI data via others MIDI channels will not affect the Wurlitzer V. If you select ALL, the Wurlitzer V will be able to receive all data from all MIDI channel.

## *3.2.12 MIDI control*

All the knobs, faders and switches on the Wurlitzer V can be manipulated with external MIDI controllers. Before anything else, make sure that the MIDI device that you wish to use is correctly connected to your computer, and that the sequencer and the Wurlitzer V application is correctly configured to receive MIDI events coming from the device.

### *MIDI menu*

The menu MIDI drop-down menu provides access to MIDI assignment functionalities.

This "MIDI" menu is composed of 2 sections :

First section (**MIDI controller configs**) provides:

- "**Create a new config**": new map configuration.
- "**Save current config as**": save current map configuration to a new one.
- "**Delete current config**": delete current map configuration from list.

Second section contains the list of existing configurations: the checked one is the current one. Click on a configuration to load it.

### *Assigning MIDI controls*

In order to start assigning MIDI controls, click the **MIDI** button. The **MIDI** button remains highlighted to indicated that the "learn mode" is ON.

All the assignable controls will be highlighted in purple.

The control you are assigning will be black framed.

The controls which are assigned will be highlighted in red.

Click a knob on Wurlitzer V to open the MIDI assignment pop-up called **MIDI Control Setup**.

- Automatic learning: the fastest and easiest way to assign a control is to move the slider or knob on your controller keyboard that you want assigned to Wurlitzer V.
- Manual assignment: it is also possible to change the assigned MIDI control number by clicking on this control then by selecting another value.
- Remove assignment: assignments can be removed by clicking the **UNASSIGN** button. The message "UNASSIGNED" will then be displayed.

All these operations deal with a single plug-in parameter. In order to setup a complete configuration, a set of parameters should be configured.

To close the learn mode, just click the **MIDI** button again.

## *Manage configurations*

You have the possibility to maintain multiple configurations.

- Default configuration: by default, Wurlitzer V loads a configuration for the Arturia Analog Experience Keyboards.
- Select one configuration: a configuration is loaded by clicking the entry in the **MIDI** drop-down menu.
- Create a new configuration: a new configuration can be created by clicking the **Create a new config** entry on the **MIDI** drop-down menu. You also can create a new configuration including your own assignment operations described in the previous section. This configuration has to then be saved by clicking on the **MIDI** drop-down menu, **Save current config as** entry. In both cases, a popup opens: **enter the name of your config**. A new entry for your configuration now exists in the list of available configurations.
- Remove a configuration: it is possible to remove a configuration by loading it and then clicking on **Delete current config**, on the **MIDI** drop-down menu.

## *Minimum and maximum bounds*

For each assignment, a minimum range value (MIN) and a maximum range value (MAX) can be set:

- The assigned parameter will have the configured minimum value when the controller will be at its lowest position.
- The assigned parameter will have the configured maximum value when the controller will be at its highest position.
- You can invert (Negative Slope) Min and Max so that parameter will have minimum value when control has the highest value, and parameter will have maximum value when control has the lowest value.

## *3.2.13 Virtual keyboard*

The virtual keyboard which appears below the main panel can allow the user of Wurlitzer V to play a sound without an external master MIDI keyboard and without programming MIDI notes in a sequencer. Just click and drag on a virtual key to hear the corresponding sound.

You can play the notes with different velocities. The more you click down the key, the higher the velocity will be.

## *3.2.14 Use of controllers*

The Wurlitzer V uses two different types of controllers: potentiometers and switches. Let´s take a look at those 2 types of controllers.

### *Potentiometers*

A potentiometer determines the value of the various parameters. There are two different types of potentiometers (fader and rotary).

The faders: place the mouse pointer over the fader, click on it and move your mouse up and down by dragging. This will increment or decrement the fader in the GUI, and display the new parameter value in a dialog box that appears next to the knob.

The rotary potentiometers: place the mouse pointer over the knob, click on it and move your mouse up and down by dragging. This will rotate the knob in the GUI, and display the new value in a dialog box that appears next to the knob.

It normally works as a **"Coarse"** adjustment. However, potentiometers can also work as "**Fine**" adjustments for more precision, when you drag your mouse with the **control** key pressed, or by using the **right click** on your mouse.

To reset the parameter value to its default setting, double click on the knob. This will set it to the center position immediately (works only on some parameters).

## *Switches*

Wurlitzer V has two types of switches. Simply click on these switches to change their state.

Some are of the "on/off" style:

Others allow a selection of one out of several options:

## 3.3 The real Wurlitzer EP 200-A interfaces

The classic EP 200-A embeds two front-mounted speakers:

A mechanical sustain pedal, similar to a conventional piano one, is fitted:

This version also contains two knobs, one to control the Tremolo circuit intensity (VIBRATO), and another one to control the volume (VOLUME), an orange LED lit when the unit is on:

## 3.4 The basic mode

The basic operating mode of Wurlitzer V is to show the tool bar at top, and the simple **Volume** and **Vibrato** knobs. These were the only controls on a true Wurlitzer.

- Volume: the volume is at 0 when the knob is facing the 9 o'clock position, like the real Wurlitzer.
- Vibrato: the vibrato controls the tremolo effect intensity. It's off at the 9 o'clock position and is fully on when turned 270 degrees. The real Wurlitzer has a fixed rate of approximately 6.34Hz. It´s a mono tremolo (volume modulation).

## 3.5 The effects

The effects section will open when the **FX** button in the toolbar is active. When you activate the **FX** button, the effects panel will automatically slide open below the Wurlitzer V keyboard.

On each effect slot you have a drop down menu at the top that have a list of the available effects or **Empty**. When you click on a drop-down menu, and select an effect, it will appear on the pedal board below. They are 5 slots on the effects pedal board that allow for a wide variety of sound.

On the Slot 1, you can select between 3 pedal effects: the Wah-Wah, Auto-Wah and Volume pedal.

The others 4 slots provide various effects, though different from the Slot 1. Below is a list of the available effects on each effect drop down menu:

By choosing the **Empty** option on the drop down menu will close the effect pedal, only the drop down menu remains visible.

Each effect also has a bypass button. Bypassing the pedal will not remove the graphic and the parameters, the signal will be 100% dry. When the pedal is on, the red LED of the effect turns on, when you bypass the effect, the LED will turn off.

All effects parameters are MIDI assignable and learnable. You can easily assign a MIDI pedal controller to your Wurlitzer V and control your effects with it.

As we saw in the Tool bar (chapter 3.2.6), the Wurlitzer V has three output options:

- **Direct to studio**

- **Guitar amp**

- **Leslie speaker**

### *3.5.1 SLOT 1: Wah-Wah/Auto-Wah/Volume pedal*

This Slot provide 3 effects: Wah-Wah, Auto-Wah and Volume pedal.

## *Volume pedal*

This works as a volume pedal that is assigned to MIDI CC #7. You can also click and drag on the pedal to change the volume amount.

## *Wah-Wah*

This works as a standard wah-wah pedal. It defaults to being assigned to being assigned to MIDI CC #11 Expression. You can also click and drag on the pedal to change the wah-wah frequency.

### *3.5.2 Auto-Wah*

| | |
|---|---|
| **Freq** | Control the resonance frequency of the Wah-wah effect. |
| **Thresh** | Sets the sensitivity of the Auto-wah. |
| **ModDepth** | Sets the depth of the Auto-wah effect. |
| **AutoRate** | Sets the speed of the Auto-wah. |

In **Auto-Wah** mode, the wah-wah effect is triggered by the amplitude of the incoming sound. **Thresh** sets the level at which the Auto-Wah is triggered. If the threshold is set to the extreme left, the effect will be disabled. The more you push it to the right, the lower the amplitude that starts triggering the wah-wah effect.

The **ModDepth** controls the amount of frequency shift of the wah-wah filter. Turn this up to get more of a filter sweep sound.

The **Freq** control will set the center frequency of the filter effect.

The **AutoRate** will automatically control the filter frequency. This control when set to 0 has no effect. When it is turned up, it will control the speed of the Auto-Wah effect.

### *3.5.3 Flanger*

| | |
|---|---|
| **Delay** | Sets the delay time which changes the harmonic content. |
| **Depth** | Sets modulation depth - set to less than 100% to limit build up of low frequencies with resonance. |
| **Rate** | Sets modulation rate (sine wave) - set to minimum for static comb filtering. |
| **Res.** | Add positive or negative feedback for harsher or "ringing" sound. |

The Flanging effect is created by mixing two identical signals together with one signal delayed by a small and gradually changing period. Varying the **Delay** amount causes these to sweep up and down the frequency spectrum. Flanging can create both subtle and extreme effects, depending on the **Rate** and **Depth** of the modulation. With high setting of Depth, you will hear pitch changes to the sound. This is due to the fact that we are modeling how the circuits, in an analog flanger, works. When the delay time is modulated, it changes the pitch in analog bucket brigade devices.

### *3.5.4 Phaser*

| | |
|---|---|
| **Rate** | Sets the speed of the phaser. |
| **Depth** | Sets the depth of the phaser action. |
| **Feedback** | Set the phaser resonance. |
| **Stereo** | Sets the stereo width. |

The phase shifter was one of the most popular effects used with electric pianos in the 70´s. It works by splitting the incoming signal and changing the phase of it in reference to the dry signal. Doing this creates a filter that combs (with notches) the frequency spectrum. You can then change this phase to the rhythm of an oscillator which follows the frequency set with the **Rate** button. The **Depth** button sets the amplitude for the action of the filtering, while **Feedback** amplifies certain harmonics. Sonically, phasing is used to create whoosing, sweeping sounds that wander through the frequency spectrum.

### *3.5.5 Chorus*

| | |
|---|---|
| **Type** | Sets the 3 chorus types. |
| **Rate** | Sets the speed of the chorus. |
| **Delay** | Sets the delay applied to the input signal. |
| **Amount** | Sets the depth of the chorus action. |
| **Mix** | Sets the ratio between the input signal gain and processed signal gain. |
| **Stereo Rate** | Set the speed of the stereophonic evolution. |
| **Stereo Width** | Sets the width of the stereophonic space. |

The chorus module makes it sound like there are multiple people playing the same instrument at about the same time. When two people play, there is always a slight tuning difference that results in a sound that is described as beating. The speed of this beating is set by the **Rate** knob, the amplitude by the **Amount** and the width with the **Delay**. The resulting frequency blurring is different for the left and right tracks. This allows us to get a stereophonic signal from a monophonic signal. The difference between the 2 tracks can be set with the **Stereo width** and the speed of the left right rotation with the **Stereo rate** knob.

A selector **Type** offers three different chorus engines: simple, medium, complex.

The **Mix** potentiometer sets the ratio between the input signal and the treated signal.

### *3.5.6 Delay*

| | |
|---|---|
| **Delay** | Sets delay time (delay is mono for authenticity). |
| **LFO rate** | Sets modulation rate. |
| **Feedback** | Sets Feedback. |
| **FB Tone** | Sets feedback filtering. |
| **Mix** | Sets wet/dry mix. |
| **LFO Depth** | Sets the amount of delay time modulation (sine wave). |

A delay repeats a sound, like an echo, giving it more space and depth. This analog delay reproduces the sound of the old solid state units that used analog bucket brigade circuits. The **Delay** knob allows you to select a time between 12ms and 1000ms for the delay. The **Feedback** knob sets the feedback level. The **FB Tone** knob controls a feedback filtering effect, low-pass to left, high-pass to right. You can set the delay modulation by changing the **LFO rate** and **LFO depth** values. The **Mix** potentiometer sets the ratio between the original and modified signals.

### *3.5.7 Compressor*

| | |
|---|---|
| **Input** | Sets input gain level. |
| **Threshold** | Sets threshold level. |
| **Ratio** | Sets the amount of gain reduction. |
| **Attack** | Sets the attack time. |
| **Release** | Sets the release time. |
| **Makeup** | Sets the output gain level. |

A compressor evens out differences in gain, reducing dynamics (difference in volume between

quiet sounds and loud sounds). This effect is often used to "fatten" a sound by making every individual element of the sound closer to the same volume. Every time a sound goes over a certain volume (**Threshold**), it is reduced by a specified amount (**Ratio**) . **Attack** and **Release** determine how quickly the reduction is added and how quickly it disappears. **Makeup** boosts the compressed signals output level.

## *3.5.8 Overdrive*

| | |
|---|---|
| **Drive** | Sets the amount of distortion. |
| **Output** | Sets output trim level. |
| **Tone** | Sets the low-pass filter. |

An overdrive effect saturates and distorts a sound by increasing the volume of a signal then clipping the excess. The **Drive** knob sets the amount of saturated sound. The **Tone** knob controls the distortion filtering. You can adjust the output level by setting the **Output** knob.

## *3.5.9 Vocal Filter*

| | |
|---|---|
| **Rate** | Sets the rate of the vocal filter LFO. |
| **LFO On/Off** | Starts or stop the LFO activity. |
| **Res** | Sets the band width of the 5 band pass filters of the vocal filter. |
| **Mix** | Sets the balance between the input level and the treated level. |

The Vocal filter is a formant filter. The **LFO Rate** knob and **LFO On/Off** selector set the LFO parameters. The **Resonance** knob sets the band width of the filter, when set all the way to the right, it results in a very thin audio signal close to a ringing sound.

The **Dry/Wet** potentiometer sets the ratio between the input signal and the treated signal.

The main interface of the Vocal filter, located on the central TV style screen, shows a series of five vowels (A,E,I,O and U).

The Vocal filter frequency can be set in real time:

- Manually by moving the red ball cursor between five vowels or moving the vowel letters by dragging them on the screen surface of the Vocal filter.
- An LFO is also available to modulate the cursor movements.
- You can set the radius amplitude of the LFO by clicking on the red ball cursor and moving it out of its initial central place. This action will set width of the circular ball movements.
- It´s also possible to re-arrange the order of the five vowels on the screen space. To do this, simply click on one of the 5 letters and drag it to the place you wish on the screen. Those changes will introduce some interesting variations when you modulate your five filters manually or with the LFO.

## *3.5.10 Pitch Shift Chorus*

| | |
|---|---|
| **Delay** | Sets a trade-off between latency and low frequency response. |
| **Mix** | Sets the ratio between the input signal gain and treated signal gain. |
| **Detune** | Sets Detune amount in cents. |
| **Level** | Sets the trim level. |

The pitch shift chorus is a pitch shifter that allows you to create nice thick unison detune sounds. It is a different sound than you get from a standard chorus. You can set the detune amount (left channel is lowered in pitch, right channel is raised) setting the **Detune** knob. The Delay knob sets the delay time of the input signal, to offset the latency and low frequency response.

The **Mix** potentiometer sets the ratio between the input signal and the treated signal, and the **Level** knob sets the trim level of the mixed signal.

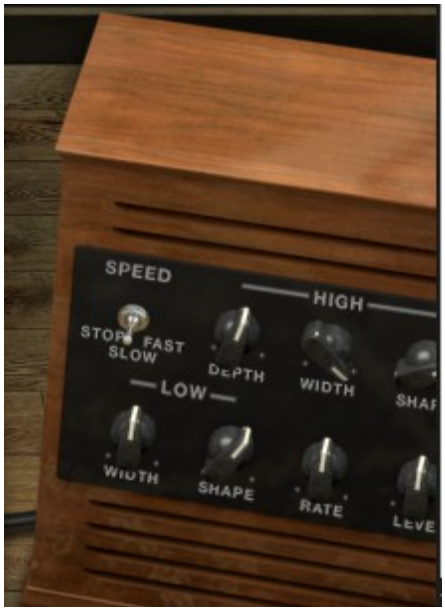
### *3.5.11 Reverb (Direct output)*

| | |
|---|---|
| **Input** | Sets input gain. |
| **Mix** | Sets the ratio between the input signal gain and treated signal gain. |
| **Time** | Sets pre-delay time. |
| **Fbk** | Sets pre-delay feedback. |
| **Damp** | Sets high frequency damping. |
| **Bright** | Sets the brightness. |
| **Diff** | Sets the amount of diffusion. |
| **Dec** | Sets the decay time. |

A reverb emulates the reflections of a sound in a different space (room, hall, etc). The material section (**Damp** and **Brightness**) sets the timber for the reverb (dark or bright sounding). The shape section (**Diffusion** and **Decay**) sets the size and duration of the reverb. The pre-delay section (**Feedback** and **Time**) adds a small delay to the reverb to emulate early reflections.

The **Mix** potentiometer sets the ratio between the input signal and the treated signal.

## *3.5.12 Leslie speaker simulator*




| | |
|---|---|
| **Speed** | Sets rotor speed: stop/slow/fast. |
| **High Depth** | Sets high rotor frequency modulation (doppler). |
| **High Width** | Sets high rotor pan modulation. |
| **High Shape** | Sets high rotor amplitude modulation. |
| **Low Width** | Sets low rotor pan modulation. |
| **Low Shape** | Sets low rotor amplitude modulation. |
| **Rate** | Fine control for rotor speed. |
| **Level** | Sets output level. |

The Leslie speaker, normally associated with the B3 organ, takes advantage of the Doppler Effect by using an electric motor to rotate an acoustic horn around a loudspeaker, sending its sound in a 360 degree circle. This results at the listener's ear in rapidly fluctuating frequencies of a keyboard note. Using a Leslie with a Wurlitzer allows for a unique sound not typically heard.

The **High Shape** and **High Width** set the parameters of the high rotor (amplitude and pan of the treble sounds).

The **Low Shape** and **Low Width** set the parameters of the low rotor (amplitude and pan of the bass sounds).

**Speed** and **Rate**, sets the rotor speed.

**High Depth** controls the Doppler effect of the Leslie speaker.

**Level** sets the output audio gain.

## *3.5.13 Guitar amp simulator*

| | |
|---|---|
| **Vol** | Sets the volume level. |
| **Drive** | Sets the drive level. |
| **Reverb** | Sets the reverb level. |
| **Lo** | Sets low frequencies equalization. |
| **Mid** | Sets medium frequencies equalization. |
| **Hi** | Sets high frequencies equalization. |
| **Microphone** | Select between 4 types of microphones. |
| **Cabinet** | Select between 4 types of cabinet. |

This module digitally emulates a physical guitar amplifier. For many users, the original band experience with a Wurlitzer piano was taking the Wurlie and plugging it into a guitar amp. It gives the Wurlie a sound that many of us remember well.

**Lo**, **Hi** and **Mid** knobs allow you to sculpt the tone. These potentiometers boost or cut the energy of specific frequency bands.

The **Drive** knob sets the gain of saturation, the **Reverb** knob sets the reverb level.

**Microphone** option allows you to select between 4 types of microphones and positions (Dyna57 on Axis, Dyna57 Off Axis, SH421 Front or YOU87 Front). This is a simulation of the most common ways to mic up a guitar amplifier. You can select the type of microphone by clicking the drop down meu at the top left of the cabinet.

**Cabinet** option allows you to select between 4 types of guitar amp cabinet (1x12" Blackface, 2x12" Blackface, 4x10" Tweed or 4x12" HalfStack). Each of these classic cabinets have different tonal characteristics. You can select the type of cabinet by clicking the drop down menu at the bottom left of the cabinet.

# 4 MODES OF OPERATION

## 4.1 Standalone

Wurlitzer V can be used as an instrument independently from a sequencer software (Standalone mode).

This allows you launch the application as a single instrument, and to play it using an external MIDI keyboard.

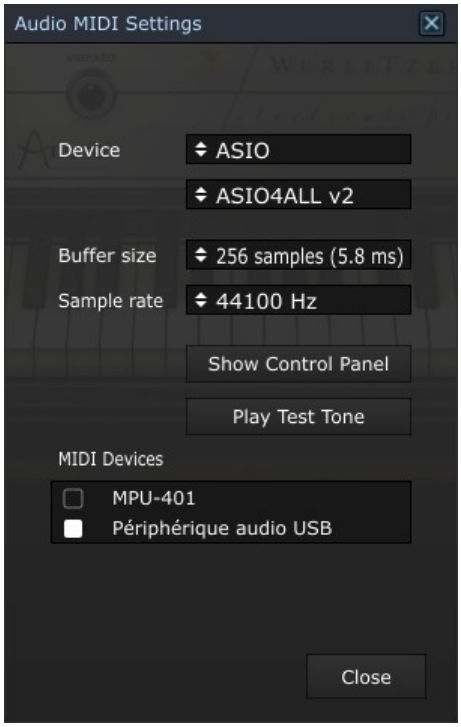
### *4.1.1 Launch the application*

To launch the Wurlitzer V application,

- on Windows, go to the menu Start > Programs > Arturia > Wurlitzer V, and choose "Wurlitzer V".
- on Macintosh, open the finder > Applications > Arturia and double-click on the Wurlitzer V application icon.

### *4.1.2 Configuration of the instrument*

Click on the "Settings" (Windows, on the application menu bar) or "Preferences" (Mac). It will show the following "Audio MIDI Settings" dialog box.




In this option menu you can:

- Set the audio output port
- Choose the audio interface
- Choose memory buffer size (smaller size will increase the load on the CPU but will reduce latency, and reciprocally)
- Choose sample rate between 44100 Hz and 96000 Hz
- Choose one or several active MIDI input port(s)

## 4.2 VST 2

VST (Virtual Studio Technology) is a plug-in standard created by Steinberg. It allows you to integrate software audio synthesizers and effect plug-ins with audio DAWs and host software. VST is supported by a large number of audio applications like Cubase, Nuendo, Wavelab, FL Studio, Audacity, Samplitude, Sonar, Audition, Live, etc.

The VST interface was updated to version 2 in 1999. One of the additions was the ability for plug-ins to receive MIDI data. This allowed for the introduction of VSTi (Virtual Studio Technology Instrument) format plug-ins.

## 4.3 VST 3

VST3 is a new update of VST audio plugins protocol. It was updated in 2008. This has improved performance over previous versions of VST and has many new features as well. Cubase 6 and Nuendo 5 are using this new protocol.

With VST3 on Windows, users do not have to choose a folder path to install the plug-in. The installer will put VST3 files automatically into the appropriate directory on your hard drive.

## 4.4 RTAS

RTAS, short for Real-Time AudioSuite is an audio plug-in developed by Digidesign (AVID technology) for their Pro Tools systems.

## 4.5 AU

AU for Audio Units is a plug-in protocol developed by Apple Computer. It used by Apple applications such as GarageBand, Soundtrack Pro, Logic Express, Logic Audio, Final Cut Pro, Mainstage, Ardour, Ableton Live, REAPER and Digital Performer.

## 4.6 64-bit compatibility

Wurlitzer V is optimized for both 32-bit and 64-bit modes. If you have a 64-bit operating system and a 64-bit digital audio workstation, you should use 64-bit version of the plug-in (for Windows).

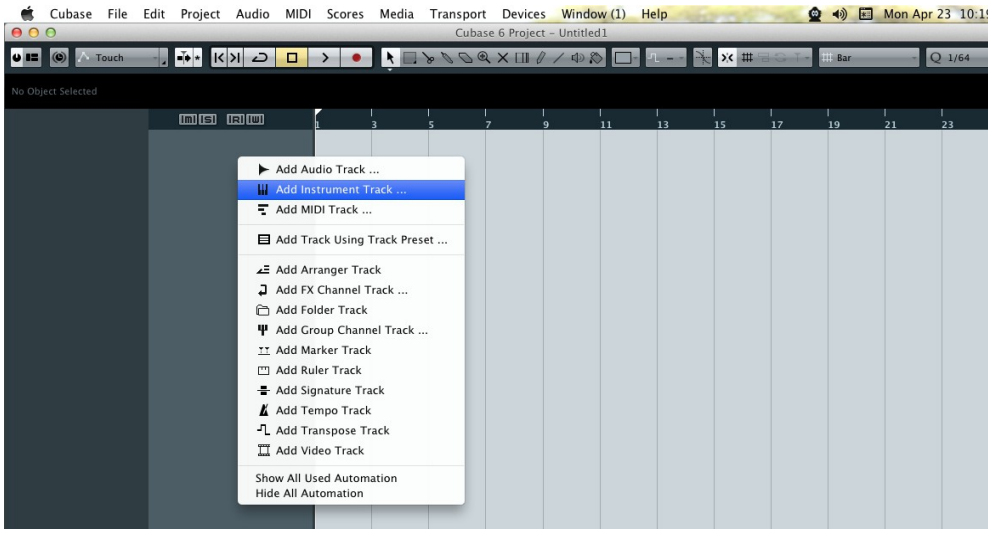
Usually on 32-bit Windows, all 32-bit programs are installed in `C:\Program Files`. However on 64-bit Windows, you can find the 64-bit programs in `C:\Program Files\` and the 32-bit programs in `C:\Program Files (x86)\`.

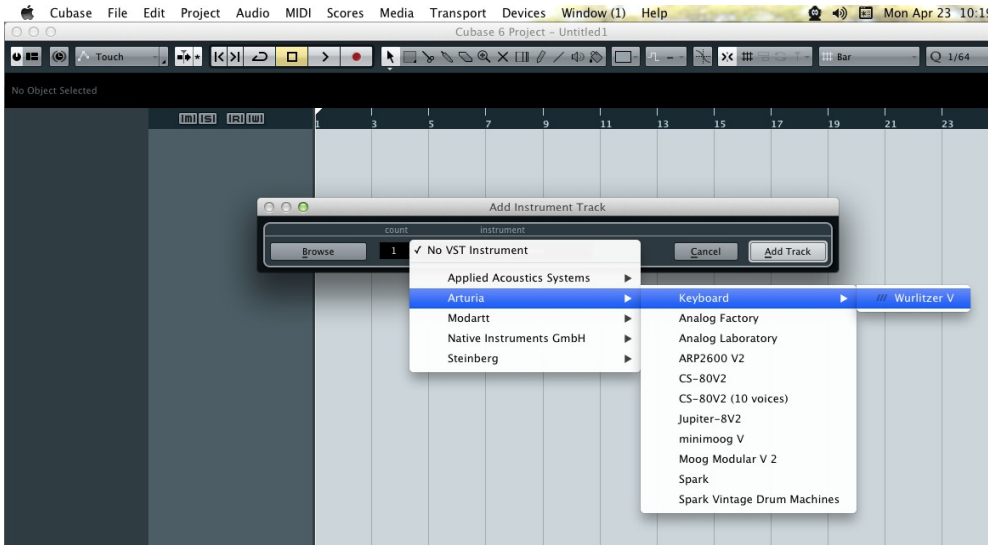
Mac users don´t have to bother with this, because the same plug-in file contains both the 32-bit and the 64-bit versions, and the host automatically chooses the better one.

## 4.7 Use in Cubase/Nuendo (VST)

### *4.7.1 Instrument use in VST mode*

The opening of a Wurlitzer V VST plug-in is the same as opening all other VST plug-ins. Please consult the instruction manual of your host sequencer for more specific information. Under Cubase/Nuendo, create a new "Instrument" track, and choose Wurlitzer V in the rack.






### *4.7.2 Rescan the plug-in directory in Cubase*

If the Wurlitzer V does not appear in the list of VST plug-ins, you can perform a "rescan" of the plug-in directory.

### *4.7.3 Saving of presets*

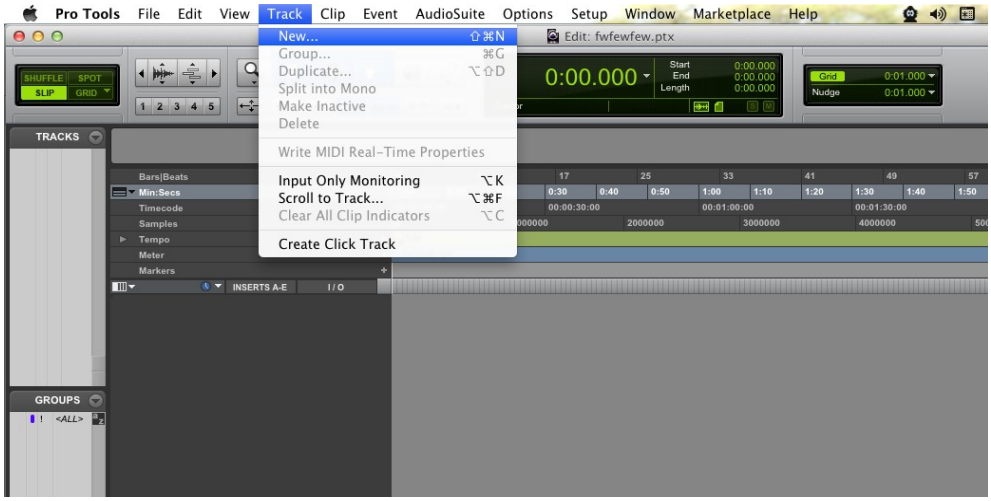
When the session/project is saved, Wurlitzer V is saved in its last mode of operation, with all modifications intact. For instance, if you were working on a "P1" preset in which you had modified parameters (without saving them as a separate preset within the plug-in itself), the next time you open the project, Wurlitzer V will load the "P1" preset plus the modifications you made previously.

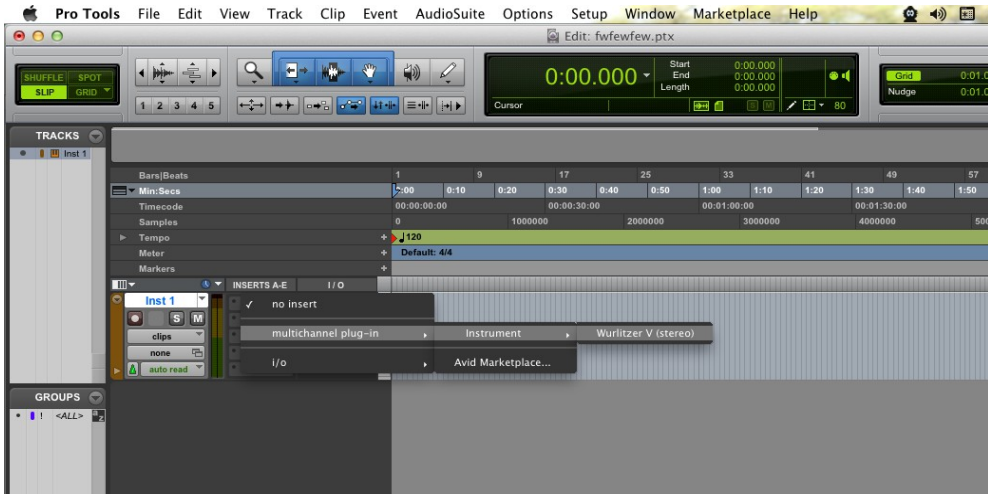
The drop-down menu in which the VST sequencer allows you to save a new preset is of course usable with Wurlitzer V. However, it is highly advised to use the Wurlitzer V internal menu: the presets saved in this way are usable in any other mode (standalone or with other sequencers), they can be exported and exchanged more easily, and they will remain compatible with the Wurlitzer V future versions.

## 4.8 Using in Pro Tools (RTAS)

### *4.8.1 Opening of the plug-in*

Access to the Wurlitzer V plug-in is like all other plug-ins in Pro Tools, via a new Instrument Track creation:






Wurlitzer V must be loaded on an instrument stereo track. We can now make Wurlitzer V sound by playing with the mouse on the virtual keyboard.

## *4.8.2 Saving the presets*

When the session is saved, the status of Wurlitzer V is saved as it is, even if its programming does not correspond to the preset. For example, if you are working on a preset "P1" in which you have modified the parameters (without saving them in the plug-in itself), the next time you open the session, Wurlitzer V will load the "P1" preset plus the modifications you made to it. The "Librarian Menu" of Pro Tools can be used with Wurlitzer V like with all other plug-ins.

Nevertheless it is highly recommended to use the internal Wurlitzer V menu: with the presets saved like this, they are usable no matter which mode is chosen (standalone or other sequencer), and they can be exported, exchanged more easily, and will stay compatible with future versions of Wurlitzer V.

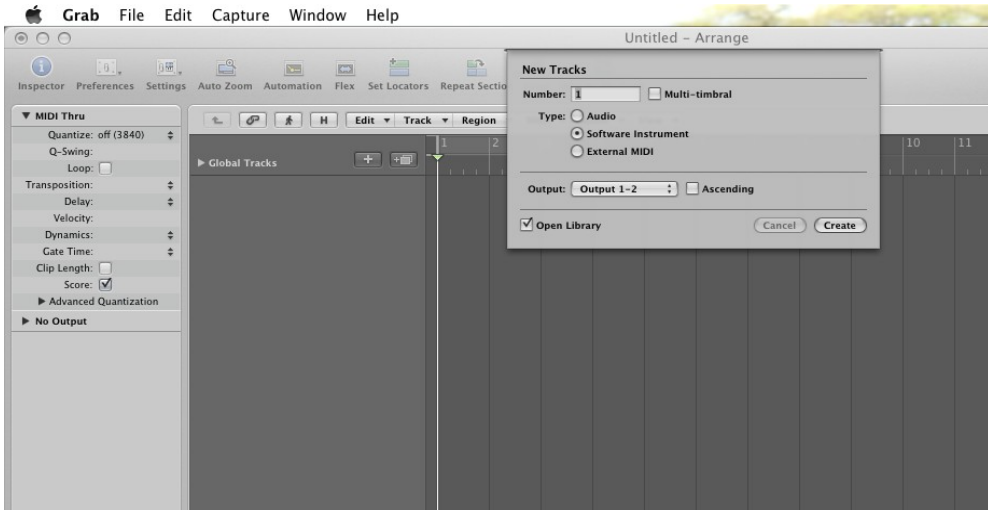
### *4.8.3 Automation under Pro Tools*

The automation function with Wurlitzer V functions like with all RTAS/HTDM plug-ins (check the Pro Tools documentation for more details on plug-in automations).

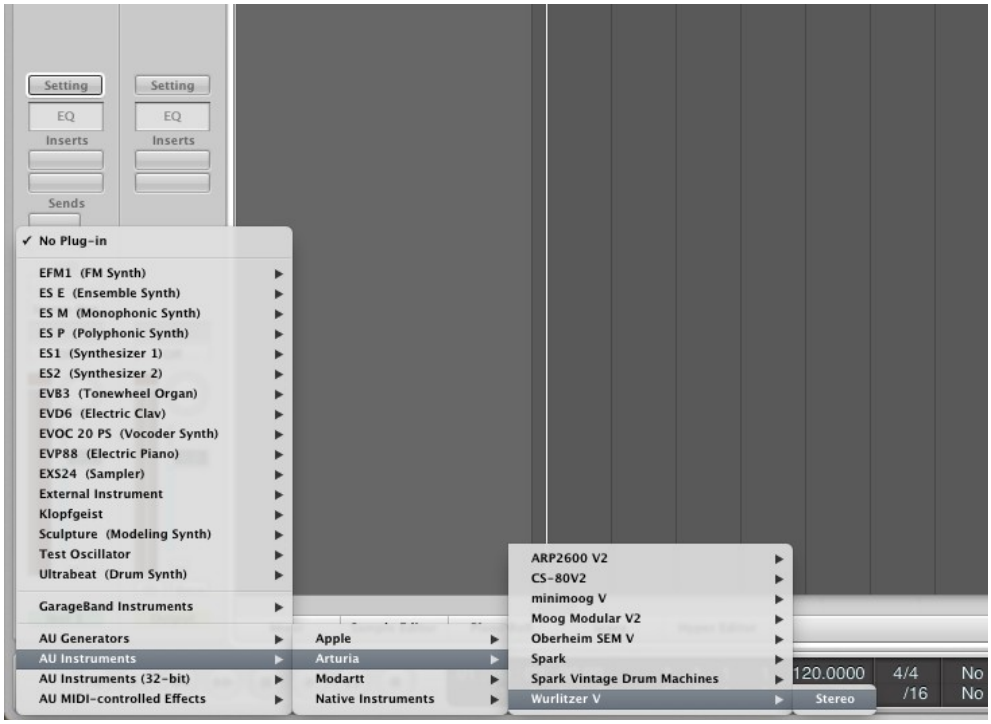
## 4.9 Using in Logic, Mac OS X only (AU)

Make sure the plug-in has been tested OK in the Logic Audio Units Manager. To launch it, click on the menu "Preferences > Start Logic AU Manager".

Create a new Software Instrument track.

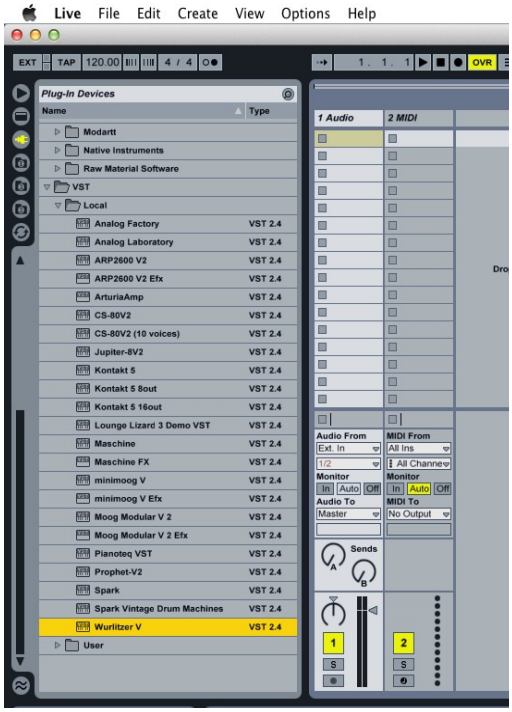


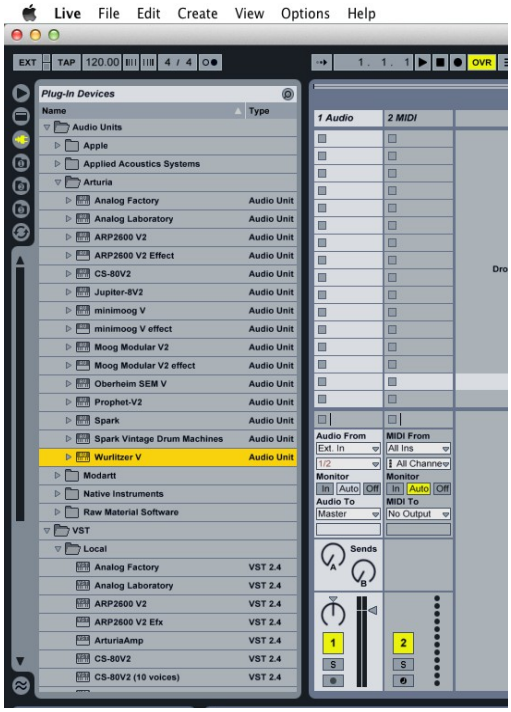

On the channel of the mixer corresponding to the selected track, click on the button "**I/O**" to list the available plug-ins, then select "AU Instruments > Arturia > Wurlitzer V > Stereo".



# 4.10 Using in Ableton Live (AU and VST)

From the plug-ins tab, simply double click on the Wurlitzer V VST or AU icon, or drag-and-drop the plug-in into a MIDI track:




If necessary, you can perform a rescan of the plug-in directory in the Preferences, "File Folder" tab: press the "Scan" button, or press "Scan" while holding the [Alt] key for a full rescan.

# 5 END USER LICENSE AGREEMENT

## 1. General

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